REMARKS

Claims 19, 21, 22, 24, and 27 have been amended and claims 28 and 29 added for reasons unrelated to patentability. Specifically, the amended and new claims more positively recite and distinctly define that which applicant regards as his invention. Claims 11-29 are pending in the application.

CONCLUSION

No fees are believed to be payable with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayment to Deposit Account No. 50-1170.

The application is now ready for examination on the merits. Early notification of such action is earnestly solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Amended Specification Paragraphs

Paragraph beginning on page 1, line 3:

This application claims priority under 35 U.S.C. §119(e) to U.S. Provisional Patent Application No. 60/184,007 entitled Catalytic Bed Reactor, filed February 22, 2000, and under 35 USC §119(a) to G.B. 0001699.8, filed January 25, 2000 and G.B. 0017188.4, filed July 13, 2000, the entirety of each of which is incorporated herein by reference.

VERSION WITH MARKINGS TO SHOW CHANGES MADE
Amended Claims

Please substitute pending claims 19, 21, 22, 24, and 27 with the corresponding amended claims as follows:

19. (Amended) A reactor according to claim 18, wherein the fluid flow passages comprise serpentine portions including a series of ~~radically~~ short, sharp turns.

21. (Amended) A process for performing chemical reactions under controlled temperature conditions, the process comprising:

(a) delivering reactant fluids successively through a chemical reaction zone to achieve a reaction and through a heat exchanger that bounds the chemical reaction zone and that allows heat exchange between the reactant fluids and a heat transfer medium, the heat exchanger at least in part being defined by a printed circuit heat exchanger (PCHE) panel providing (1) passages providing for flow of the heat transfer medium therein and (2) passages providing for flow of the reactant fluids therein;

(b) introducing the heat transfer medium to the PCHE panel; and

(c) causing the heat transfer medium to pass in at least two differing directions through the passages in the PCHE panel with respect to the flow of fluid reactants through the passages in the PCHE panel.

22. (Amended) A reactor comprising:

(a) first and second adiabatic beds of catalyst, each of which includes a catalyst,

(b) a heat exchange panel disposed between said first and second beds, the heat exchange panel including;

(1) printed circuit heat exchange (PCHE) plates for receiving heat exchange medium, at least one of the ~~heat exchange~~PCHE plates including (i) a

heat exchange medium inlet and a heat exchange medium outlet, the inlet and outlet being disposed on opposite ends of the PCHE plate, and (ii) a passage between the heat exchange medium inlet and the heat exchange medium outlet, the passage being configured to permit a heat exchange medium flowing therethrough to flow multiple times across the PCHE plate;

(2) a reactant fluid flow plate having a passage through which reactant fluids can flow, the reactant fluid flow plate being disposed between two ~~heat exchange~~PCHE plates, and

(3) a header located external to and at each end of ~~the reactant fluid flow plate and~~ the ~~heat exchange~~PCHE plates, each header including a partition to separate the inlet and the outlet at each end.

24. (Amended) A reactor according to claim 22, wherein the heat exchange medium comprises ~~steam~~at least one of a molten salt, a molten metal, a hot liquid, a hot gas, a steam, a superheated steam, a chilled liquid, a chilled gas, a vaporizing fluid, and a condensing fluid.

27. (Amended) A reactor comprising:

(a) reaction zones;

(~~a~~b) a heat exchange panel disposed between said reaction zones, and including at least first and second superposed printed circuit heat exchange (PCHE) plates, wherein surface structures on the ~~heat exchange~~PCHE plates form

(i) a heat exchange medium inlet and a heat exchange medium outlet, one of the heat exchange medium inlet and the heat exchange medium outlet being disposed on an upper side of the panel and the other being disposed on a lower side of the panel, and

(ii) a passage between the heat exchange medium inlet and the heat exchange medium outlet, the passage permitting a heat exchange medium to flow horizontally across the panel,

~~(iii) a reactant inlet and a reactant outlet, the reactant inlet and the reactant outlet being disposed on opposite sides of the plate, and~~

~~(iv) a passage between the reactant inlet and the reactant outlet, the passage permitting reactant fluids to flow horizontally across the panel in at least one pass;~~

(~~b~~c) a reactant fluid flow plate through which reactant fluids can flow, the reactant fluid flow plate being disposed between two ~~heat exchange~~PCHE plates, the reactant fluid flow plate including:

(i) a reactant inlet and a reactant outlet, the reactant inlet and the reactant outlet being disposed on opposite sides of the reactant fluid flow plate, and

(ii) a passage between the reactant inlet and the reactant outlet, the passage permitting reactant fluids to flow across the reactant fluid flow plate in at least one pass; and

(e~~d~~) a header located external to and at each end of the reactant fluid flow plates and the ~~heat exchange~~PCHE plates, each header including a partition to separate the inlet and the outlet at each end of the respective plate.